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RHOPALOMYIA GOODENIAE, A NEW SPECIES OF CECIDOMYIIDAE (DIPTERA) DAMAGING *GOODENIA LUNATA* (GOODENIACEAE) IN INLAND AUSTRALIA

by PETER KOLESIK*

Summary

KOLESIK, P. (1996) *Rhopalomyia goodeniae*, a new species of Cecidomyiidae (Diptera) damaging *Goodenia lunata* (Goodeniaceae) in inland Australia. *Trans. R. Soc. S. Aust.* **120**(4), 155-160, 29 November 1996.

A new gall midge species, *Rhopalomyia goodeniae*, is described from stem galls on *Goodenia lunata* (Goodeniaceae) from the Lake Eyre region, South Australia. Detailed descriptions of the larva, pupa, male, female and infestation symptoms are given. Plants infested by this gall midge are dwarfed and develop few or no flowers.

KEY WORDS. Cecidomyiidae, *Rhopalomyia goodeniae* sp. nov., *Goodenia lunata*, Lake Eyre, South Australia.

Introduction

The insect family Cecidomyiidae is poorly known in Australia and until now, has been unrecorded from the inland regions of the continent. The species described here was found galling stems of *Goodenia lunata* J. Black (Goodeniaceae) in the vicinity of Lake Eyre South Australia in October, 1993.

Stiff (or hairy) goodenia, *Goodenia lunata*, is a perennial herb 5 - 20 cm high with 15 mm long yellow flowers. It grows in clay soils along watercourses and in sandy soils in central Australia. Flowering occurs throughout most of the year but peaks between September and November or after flooding or heavy rainfall (Cunningham *et al.* 1981; Cooke 1986).

The new gall midge species described below is placed in *Rhopalomyia*, a worldwide genus previously known in Australia from only one species, *R. californica* Felt, introduced to control *Baccharis halimifolia* (Asteraceae), an American ornamental plant turned pest on Australian pastures (McFayden *et al.* 1983; Gagné 1989a).

Materials and Methods

Plants of *Goodenia* sp. manifesting stem malformations caused by Cecidomyiidae larvae were collected at William Creek (50 km west of Lake Eyre), during a South Australian Museum collecting trip, on 22 October 1993. The few flowers produced by these plants shrank in the course of drying precluding later authoritative identification of the species. New plants were sampled into 70% ethanol from the same population on 24 August 1995 and identified by D. E. Symon, State Herbarium of South Australia, as *G. lunata*. The galls collected on the first occasion were processed in one of two ways. A small number was cut open and the larvae preserved in 70% ethanol. A larger number of galls was kept in plastic bags and the larvae were reared to adults. Pupation took place within the galls. Plastic bags were examined daily and emerged adults preserved together with their pupal skins in 70% ethanol. Canada balsam mounts of type specimens for microscopic examination were prepared according to the technique outlined by Kolesik (1995). The type series and other material retained in 70% ethanol are deposited in the South Australian Museum, Adelaide [SAMA] and the Australian National Insect Collection, Canberra [ANIC]. Dried and preserved (70% ethanol) samples of infested and uninfested plants are deposited in the State Herbarium of South Australia, Adelaide [SHSA].

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Genus *Rhopalomyia* Rübsaamen, 1892

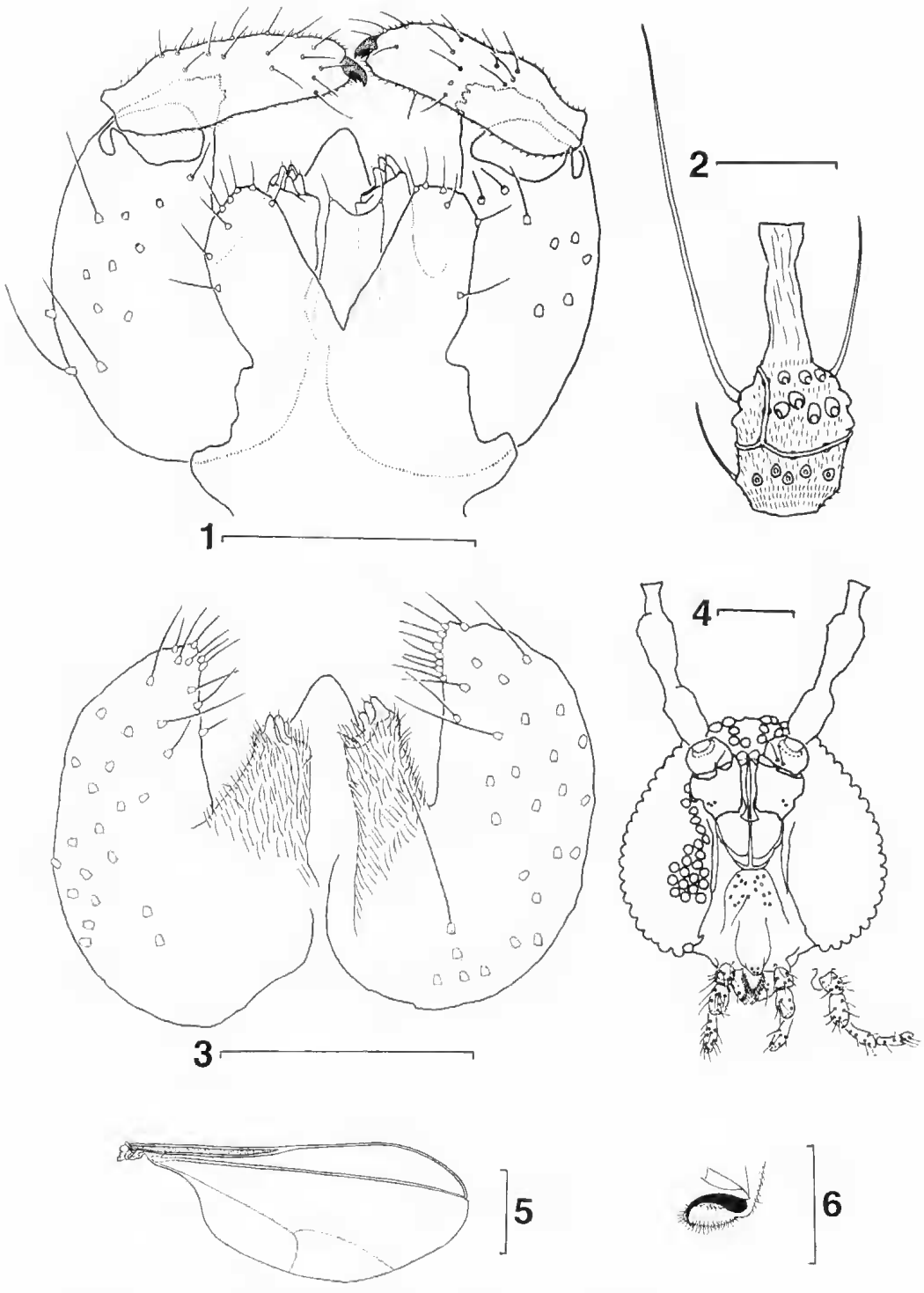
Rhopalomyia Rübsaamen, 1892: 370

Type species: Oligotrophus tanaceticola Karsch, 1879: VII. Jber. westf. ProvVer. Wiss. Kunst: 27 (des. Kieffer, 1896: 89)

Rhopalomyia is a worldwide genus comprising species of Oligotrophini with one- or two-segmented palpi, simple or toothed tarsal claws, elongate but entire eighth female abdominal tergite and completely setulose gonostylus. The species described here shares with *Rhopalomyia* all the above characters with the exception of having three- or four-segmented palpi. As the number of palpal segments is a derived character and varies within several Oligotrophini genera it does not preclude the new species from *Rhopalomyia*.

Rhopalomyia goodeniae sp. nov.
(FIGS 1-15)

Holotype: ♂, William Creek, South Australia [28°



Figs 1-6. Male of *Rhopalomyia goodeniae* sp. nov. 1. Genitalia in dorsal view. 2. Sixth flagellomere. 3. Gonocoxites, parameres and aedeagus in ventral view. 4. Head in frontal view. 5. Wing. 6. Tarsal claw with empodium. Scale bars = 100 μm 1,3, 4; 50 μm 2, 6; 500 μm 5.

55' S., 136° 20' E), 29.xi.1993, P. Kolesik, reared from larva from stem gall of *Goodenia lunata* J. Black, sampled 22.x.1993, I21328 [SAMA].

Paratypes: 2 ♂♂, 1 ♀, 2 pupal skins [SAMA], 1 ♂, 1 ♀, 2 pupal skins [ANIC], same data; 3 larvae [SAMA], 3 larvae [ANIC], collected with holotype.

Other material: 2 ♂♂, 1 ♀ [SAMA], same data; 35 larvae [SAMA], gall [SHSA - AD99511278], collected with holotype.

Description

Male (Figs 1-6)

Colour: sclerotized parts of body brown, non-sclerotized parts of abdomen orange. Wing: total length 2.7 mm (2.5 - 2.8, n = 4), width 1.0 mm (1.0 - 1.1); R5 at distal end narrower, more weakly sclerotized and slightly curved posteriorly, joining C anteriorly to apex; R1 joining C near wing mid-length; Sc cell strongly sclerotized and together with R1 and adjacent part of R5 bearing scales.

Flagellomeres 15 in number, first and second fused, with nodes longer than necks, third to fifteenth with nodes and necks about same length, circumfila comprising one transverse and one longitudinal band. Palpus four- or three-segmented with well developed palpiger in both cases. Tarsal claw simple, rounded beyond mid-length, empodia as long as claws.

Abdomen: all tergites with pair of setae in anterior corners, tergites I - VI with single setal row posteriorly and a few setae laterally, tergites VII and VIII with a few setae scattered in centre; sternites II - VIII with pair of setae anteriorly, row of setae posteriorly and fields of setae both laterally and centrally.

Genitalia: gonocoxites free ventrally, cylindrical, with small apicoventral lobe, setose and setulose; gonostylus situated dorso-caudally on gonocoxite, slightly tapering towards the apex, with apical tooth comprising strong claw and a few firm bristles, setose dorsally and setulose throughout; cerci bilobed, with several stout setae on each lobe, setulose; hypoproct bilobed, with seta on each lobe, setulose; parameres clasping aedeagus along their full length, setulose, apically bearing four to five large, setose papillae; aedeagus robust, conical.

Female (Figs 7-9, 11)

Wing: total length 1.9 mm (1.7 - 2.1, n = 2), width 0.8 mm (0.7 - 0.9); R5 straight and equally strong along full length as opposed to being narrower and curved posteriorly in male. Tergite VII with setal row posteriorly, tergite VIII with single pair of setae anteriorly, sclerotization of both tergites in shape of letter "Y". Ovipositor protrusible, cerci fused into single, terminal lamella, triangular in dorso-ventral view, setose and setulose; hypoproct trapezoid in dorso-ventral view, bearing two setae posteriorly, setulose. Other characters as in male.

Pupa (Fig. 12)

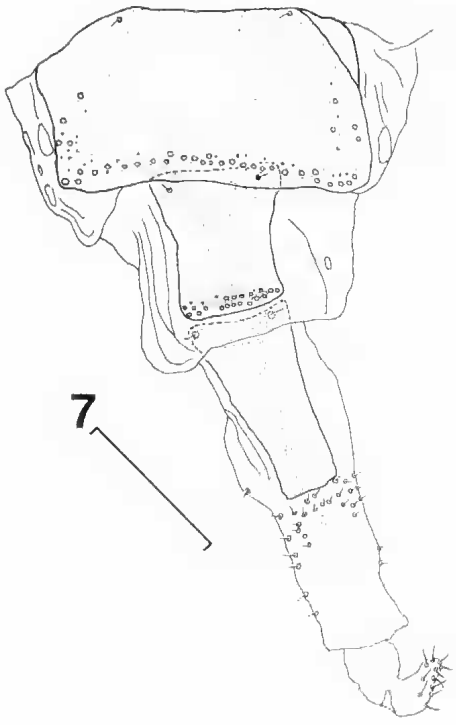
Colour: non-sclerotized parts of abdomen orange, the rest brown. Total length 2.7 mm (2.7 - 2.8, n = 4). Integument of abdominal segments covered with spiculae. Cephalic sclerite with two swellings as long as antennal horns, 30 µm (25 - 36). Cephalic pair of papillae with strong setae, 148 µm (143- 152). Frons on each side, one of two lower facial papillae with seta and one of three lateral facial papillae with seta. Prothoracic spiracle 92 - 93 µm in length, with trachea reaching its apex. Abdominal segments I - VII with pair of setose ventral papillae, two pairs of setose pleural papillae, pair of setose and two pairs of asetose dorsal papillae. Abdominal segments II - VIII dorsally with field of strong spines on anterior half. Abdominal segments VIII and IX with pair of setose ventral papillae, two pairs of setose pleural papillae and pair of setose dorsal papillae. Facial papillae with setae 5 - 6 µm, papillae on abdominal segments with setae 5 - 8 µm.

Larva (Figs 10, 13, 14)

Colour: orange. Total length 3.0 mm (2.6 - 3.4, n = 6). Integument covered with dense spiculae, up to 10 µm long. Head strongly sclerotized, 52 µm (49 - 56) long and 88 µm (85 - 91) wide, posterolateral apodemes 75 µm (70 - 79) long, antennae 17 - 20 µm long and 8 - 10 µm wide at base. Thoracic and first seven abdominal segments with pair of ventral papillae, two pairs of pleural papillae and three pairs of dorsal papillae. Thoracic segments with pair of sternal papillae and two groups of three lateral papillae on each side of spatula, two of each with setae, one without. Abdominal segment VIII with two pairs of ventral papillae, two pairs of pleural papillae and pair of dorsal papillae, all with setae. Abdominal segment IX bearing four pairs of terminal papillae, all with setae, but some papillae lacking in some specimens. Anus ventral. Setae on sternal and lateral papillae about 1 µm, on the other papillae 8 - 22 µm. Spatula 294 µm (245 - 328) long, with apical enlargement 132 µm (116 - 150) in width and 44 µm (34 - 48) in length.

Infestation symptoms (Fig. 15)

This gall midge species deforms the stems of *Goodenia lunata* into subglobular, hairy galls, 1-2 cm in diameter and 1-1.5 cm in height. Hairs are 1-2 mm long, dense, grey. The gall consists of many globular to subglobular, thick-walled cells with one larva in each cell. Infested plants develop few or no



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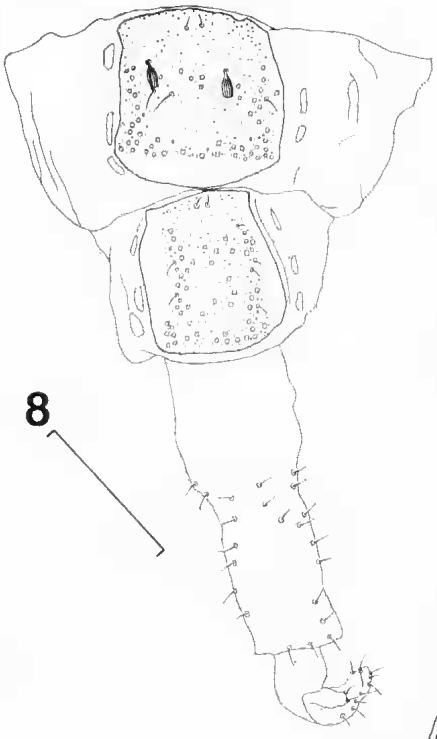

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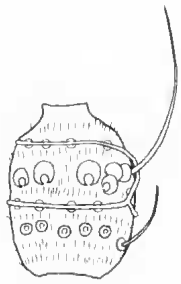

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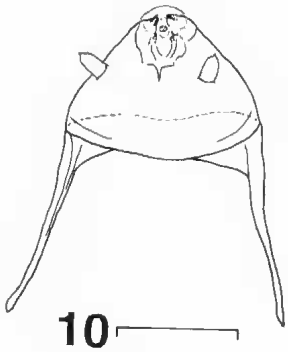

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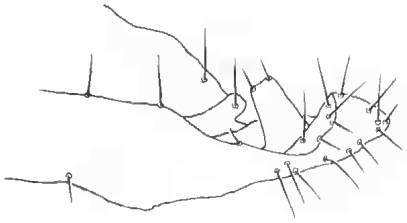

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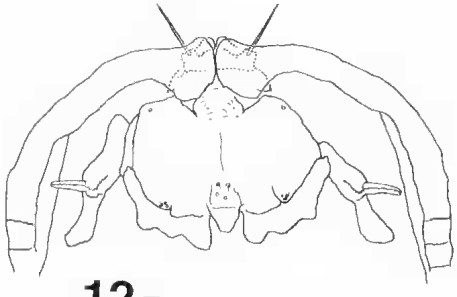

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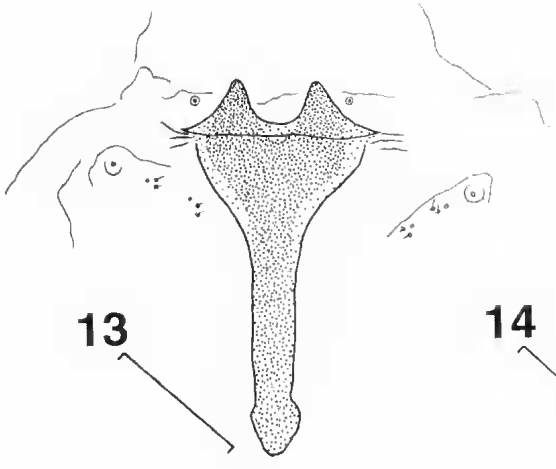

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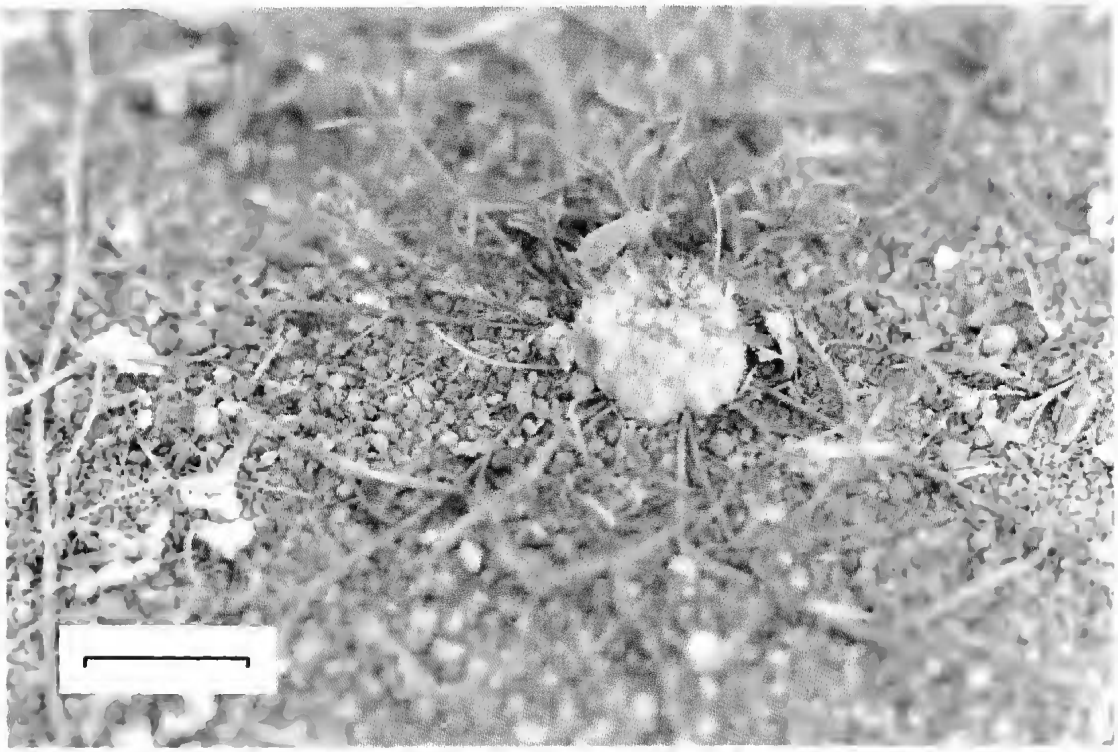

Fig. 15. Gall of *Rhopalomyia goodeniae* sp. nov. on *Goodenia lunata* J. Black. Scale bar = 20 mm.

flowers. On 22 October 1993 at William Creek, about 95% of all plants from a population comprising some 1000 plants were infested.

Etymology

Derived from the generic name of the host plant.

Discussion

Currently, the *Rhopalomyia* genus comprises 86 Nearctic (Gagné 1989b), 48 Palaearctic (Skuhravá 1986), 9 Neotropical (Gagné 1994) and 1 Oriental (Gagné 1973) species. No *Rhopalomyia* have been recorded from the Afrotropical Region (Harris 1980). Until now, only 2 immigrant species of *Rhopalomyia* have been recorded from Australasian and Oceanian Regions with *R. californica* having been introduced to Australia from North America and *R. chrysanthemi* Ahlberg to the Hawaiian Islands and New Zealand from Europe (Gagné 1989a). *Rhopalomyia* is a catchall genus with the bulk of its species producing complex galls on Asteraceae. Species that form galls on other plant families exhibit some morphological differences and their placement in *Rhopalomyia* needs restudying (Gagné 1989b). The new species described here is the first native Australian species to be placed in *Rhopalomyia* and the only gall midge known to attack plants of the family Goodeniaceae. The species does not breach the current concept of *Rhopalomyia*, except that it has two or three palpal segments as opposed to one or two segments in other described members of the genus. Although this discrepancy precludes identifying the new species as *Rhopalomyia* using the most authoritative current key to Cecidomyiidae (Gagné 1981), I find it insufficient reason to erect a new genus until more is known about its native Australian congeners.

Figs 7-14. *Rhopalomyia goodeniae* sp. nov.: 7-9, 11 female, 10, 13, 14 larva, 12 pupa. 7. Posterior end of abdomen in dorsal view. 8. Posterior end of abdomen in ventral view. 9. Sixth flagellomere. 10. Head capsule in dorsal view. 11. Posterior end of ovipositor in lateral view (cerci shriveled in available specimen). 12. Anterior part in ventral view. 13. Sternal spatula with adjacent papillae. 14. Two terminal segments in dorsal view. Scale bars = 500 µm 7, 8, 12; 50 µm 9-11; 100 µm 13, 14.

Rhopalomyia goodeniae sp. nov. differs in several characters from *R. californica*, its only Australian congener redescribed by Gagné & Boldt (1995). In *R. goodeniae*, the gonostylus is straight and about the same width throughout most of its length, the papillae on the male parameres are large (1/5 - 1/2 of paramere width), the number of palpal segments is three to four and the antennal horns in the pupa are minute and rounded. In contrast, *R. californica* has a gonostylus convex at the posterior end; papillae on the male parameres are minute (about 1/20 of paramere width), there are one to two palpal segments and the antennal horns in the pupa are elongate and bifid in frontal view.

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